APPENDIX A.

BIOASSESSMENT PROGRAMS FOR STREAMS AND WADEABLE RIVERS (2001)

Appendix A. Bioassessment programs for streams and wadeable rivers (2001)

Entity	Stream/river miles		Number of miles assessed using biology				Assemblages assessed				Habitat assessment	Reference site determination	Characterization of regional reference sites	Data analysis tools & methods	Impairment thresholds	Bioassessment uses				Other waterbody types with biological programs
Name	Total miles	Perennial miles	Total miles assessed	fully supporting for 305(b)	partially/non-supporting for 305(b)	listed for 303(d)	Benthos	Fish	Periphyton	Other	VB = visual based; QM = quantitative measurements; HY = hydrogeomorphology; O = other	SS = site specific; PW = paired watersheds; R =regional; PJ = professional judgment; O = other	HC = historical conditions; LD = least disturbed sites; GR = gradient response; PJ = professional judgment; MD = minimally disturbed; O = other	TG = tables & graphs; PA = parametric ANOVAs; MV = multivariate; BM = biological metrics; DG = disturbance gradients; O = other	MM = multimetric; MV = multivariate; CDF = cumulative distribution function; O = other	Water resource management	Aquatic Life Use Support (ALUS) in 305(b) reporting	Biocriteria in WQS		LR = large rivers; LK = lakes; RES = reservoirs; ENC = estuaries/ near coastal marine; WL = wetlands
																		Narrative	Numeric	
STATES																				
Alabama	77,274	47,077	7,103.5	5,124.4	1,979.1	1,979.1	Y	Y	N	Y	VB	R	LD	TG, BM	MM - O	Y	Y	N	N	LR, WL
Alaska	>3 million	unknown	150 watersheds	140 watersheds	10 watersheds	10 watersheds	Y	N	UD	N	VB, HY	SS, PJ	MD	TG, BM	MM - 1st quartile from the 95th %tile	Y	UD	N	N	LR, LK, ENC, WL
Arizona	127,505	4,980	0	n/a	n/a	n/a	Y	N	Y	N	VB, QM, HY	R	LD, PJ, MD	BM	MM - 25th %tile of ref. pop.	Y	N	UD	N	RES (UD)
Arkansas	87,617	28,408	245 stream segments	n/a	n/a	n/a	Y	Y	N	N	VB, QM, HY, O	SS, PW, R, PJ, O	HC, LD, PJ	TG, MV, BM, DG	MM - O	Y	N	Y	N	LR, LK, RES, WL
California	211,513	64,438	unknown	unknown	unknown	unknown	Y	N	N	N	VB	PJ, O	LD	PA, MV, BM	MV - UD	Y	UD	Y	N	LR, LK, ENC (limited)
Colorado	107,403	31,415	n/a	n/a	n/a	85.1	Y	Y	**UD**	N	VB, HY, O	SS, PJ	HC, LD, PJ, O	TG, BM	MM - UD	Y	N	UD	N	LR, LK, RES

n/a = not applicable; pop. = population; ref. = reference; UD = under development; WQS = water quality standards; – = none or information not reported

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																		Narrative	Numeric	
Connecticut	5,830	5,484	961	764	195	n/a	Y	Y	Y	Y	VB	SS, O	LD	TG, BM	MM - O	Y	Y	Y	N	ENC
Delaware	2,506	1,778	2,506	741	1,765	1,173	Y	N	N	N	VB	R, PJ	LD	BM	MM - 67th %tile of ref. pop.	Y	N	N	UD	WL
District of Columbia	39	–	39	0	39	unknown	Y	Y	N	Y	HY	PJ	–	BM	–	Y	Y	Y	N	LR, WL
Florida	51,858	22,993	4,795	4,365	430	430	Y	N	Y	Y	VB	R, PJ	LD, GR	TG, BM, DG	MM - quadra-section of best score	Y	Y	Y	Y	LR, LK, RES, ENC, WL
Georgia	70,150	44,056	1,416	477	939	–	Y	Y	N	N	VB, O	R	LD	TG, BM	MM - UD, MV - UD	Y	Y	Y	N	LR
Hawai`i	249	249	15	5	10	10	UD	Y	N	N	VB, O	R	LD	TG, BM	MM - UD	Y	UD	UD	UD	–
Idaho	96,200	49,500	16,742	8,434	8,312	8,312	Y	Y	Y	N	VB, O	R, PJ	LD, PJ, MD	TG, PA, MV, BM, DG	MM - 25th %tile of ref. pop.	Y	Y	Y	N	LK, RES
Illinois	86,021	30,246	15,304	9,498	5,806	unknown	Y	Y	N	N	VB, QM	SS, O	HC, LD, PJ	TG, PA, MV, BM, DG, O	MM - O	Y	Y	UD	N	LR
Indiana	35,673	21,094	35,430	23,000	12,430	unknown	Y	Y	Y	Y	VB	R, PJ	HC, LD, GR, O	TG, PA, MV, BM, DG	MM - CDF, O, MV - O	Y	Y	UD	N	LR, LK, RES, WL

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Entity	Stream/river miles		Number of miles assessed using biology				Assemblages assessed				Habitat assessment	Reference site determination	Characterization of regional reference sites	Data analysis tools & methods	Impairment thresholds	Bioassessment uses				Other waterbody types with biological programs
Name	Total miles	Perennial miles	Total miles assessed	fully supporting for 305(b)	partially/non-supporting for 305(b)	listed for 303(d)	Benthos	Fish	Periphyton	Other	VB = visual based; QM = quantitative measurements; HY = hydrogeomorphology; O = other	SS = site specific; PW = paired watersheds; R =regional; PJ = professional judgment; O = other	HC = historical conditions; LD = least disturbed sites; GR = gradient response; PJ = professional judgment; MD = minimally disturbed; O = other	TG = tables & graphs; PA = parametric ANOVAs; MV = multivariate; BM = biological metrics; DG = disturbance gradients; O = other	MM = multimetric; MV = multivariate; CDF = cumulative distribution function; O = other	Water resource management	Aquatic Life Use Support (ALUS) in 305(b) reporting	Biocriteria in WQS		LR = large rivers; LK = lakes; RES = reservoirs; ENC = estuaries/ near coastal marine; WL = wetlands
																		Narrative	Numeric	
Iowa	71,665	26,630	2,018	1,418	600	n/a	Y	Y	N	N	VB, QM	R, PJ	LD	TG, PA, MV, BM, DG	MM - 25th %tile of ref. pop.	Y	Y	UD	N	LR
Kansas	134,338	23,731	23,731	n/a	n/a	n/a	Y	Y	Y	Y	VB, QM	PJ	HC, LD	TG, BM, O	MM - UD	Y	Y	Y	N	LK, RES, WL
Kentucky	89,431	34,334	~30,000	~20,000	~10,000	7,500	Y	Y	Y	N	VB	R	LD, MD	MV, BM	MM - 25th %tile of ref. pop.	Y	Y	Y	N	LR
Louisiana	66,294	–	–	n/a	n/a	n/a	Y	Y	N	N	VB	SS, PJ	HC, LD, O	TG, MV, BM, O	MM - CDF, O	Y	N	Y	N	–
Maine	31,672	23,879	1,000	858.5	141.5	141.5	Y	N	Y	N	VB	R, PJ	LD, GR, PJ, MD	TG, MV, BM, DG	MV	Y	Y	Y	UD	LR, LK (UD), RES, ENC
Maryland	17,000	12,343	6,142	3,429	2,713.4	178 actual listings	Y	Y	N	Y	VB, QM, O	O	LD	TG, PA, MV, BM, DG, O	MM - 10th %tile	Y	Y	UD	N	ENC
Massachusetts	8,229	7,133	1,344	649	695	695	Y	Y	Y	Y	VB	SS, PW, R, PJ	LD	TG, BM	MM - 83rd %tile of ref. pop.	Y	Y	N	N	LK, RES
Michigan	49,141	27,873	21,469	15,469	6,000	2,600	Y	Y	N	N	VB	SS	n/a	TG, BM	MM - O	Y	Y	N	N	LR
Minnesota	91,944	32,985	2,047	1,575	472	785	Y	Y	N	Y	QM	R, PJ	LD, O	TG, BM, DG	MM - O	Y	Y	Y	N	LR, LK, RES, WL

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Entity	Stream/river miles		Number of miles assessed using biology				Assemblages assessed				Habitat assessment	Reference site determination	Characterization of regional reference sites	Data analysis tools & methods	Impairment thresholds	Bioassessment uses				Other waterbody types with biological programs
Name	Total miles	Perennial miles	Total miles assessed	fully supporting for 305(b)	partially/non-supporting for 305(b)	listed for 303(d)	Benthos	Fish	Periphyton	Other	VB = visual based; QM = quantitative measurements; HY = hydrogeomorphology; O = other	SS = site specific; PW = paired watersheds; R =regional; PJ = professional judgment; O = other	HC = historical conditions; LD = least disturbed sites; GR = gradient response; PJ = professional judgment; MD = minimally disturbed; O = other	TG = tables & graphs; PA = parametric ANOVAs; MV = multivariate; BM = biological metrics; DG = disturbance gradients; O = other	MM = multimetric; MV = multivariate; CDF = cumulative distribution function; O = other	Water resource management	Aquatic Life Use Support (ALUS) in 305(b) reporting	Biocriteria in WQS		LR = large rivers; LK = lakes; RES = reservoirs; ENC = estuaries/ near coastal marine; WL = wetlands
																		Narrative	Numeric	
Mississippi	84,003	26,454	1,365	505	860	860	Y	N	N	N	VB, O	R	LD	TG, MV, BM, DG	MM - UD	Y	Y	N	N	LR, LK, ENC
Missouri	52,194	22,194	21,996	11,519	10,477	n/a	Y	Y	N	N	VB, QM, O	SS, R, PJ, O	LD, MD	TG, PA, MV, BM	MM - cumulative score = 81% of ref. condition	Y	Y	Y	UD	LR
Montana	176,750	53,221	9,076	1,340	7,736	7,736	Y	Y	Y	Y	VB, QM, HY, O	SS, R, PJ	HC, LD, PJ, MD	TG, PA, MV, BM, DG	MM - 75% of ref. condition	Y	UD	UD	N	LR, LK, RES
Nebraska	81,573	16,090	16,314	13,867	2,447	0	Y	Y	N	N	VB, QM	SS, R, PJ	LD, O	TG, PA, BM	MM - 25th %tile of ref. pop.	Y	Y	Y	N	LK, RES , WL
Nevada	143,578	14,988	602	0	0	0	Y	N	UD	N	VB, QM, O	SS, PW, R, PJ (all UD)	HC, LD, PJ (all UD)	TG, MV, BM (UD), DG	–	Y	UD	UD	N	RES
New Hampshire	10,881	8,636	400	389	11	0	Y	Y	N	Y	VB	SS, PJ	n/a	TG, BM	–	Y	Y	Y	UD	LK, WL
New Jersey	6,500	–	330	121	209	–	Y	Y	N	N	VB	R, PJ	LD	BM	MM - USEPA RBPs	Y	Y	N	N	LK, ENC (all UD)
New Mexico	110,741	8,682	~5,875	~3,200	~2,675	UD	Y	Y	Y	Y	VB, HY, O	PJ	n/a	TG, BM	MM - 95th %tile of ref. pop.	Y	Y	**N**	N	LR, LK

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New York	52,337	46,266	16,000	15,430	570	484	Y	Y	Y	N	QM	SS	n/a	TG, BM, O	MM - 75th %tile of all sites	Y	Y	N	N	–
North Carolina	37,662	–	32,072	29,929	2,143	2,143	Y	Y	Y	Y	VB	R	LD	TG, PA, BM, DG	MM - O	Y	Y	Y	N	WL, RES
North Dakota	54,427	unknown	14,426	9,923	4,503	–	Y	Y	Y	N	VB, HY	R	LD	TG, BM, DG	MM - O	Y	Y	Y	N	–
Ohio	29,113	29,113	9,535	5,204	4,331	2,052	Y	Y	N	N	VB	R	LD	TG, BM	MM - 25th & 75th %tile of ref. pop.	Y	Y	Y	Y	LR, LK, RES, WL
Oklahoma	78, 778	22,386	13,313	UD	UD	UD	Y	Y	N	N	QM	R, O	LD	TG, BM	MM - CDF	Y	UD	Y	Y	UD
Oregon	114,823	51,695	40,188	12,056	28,132	unknown	Y	Y	Y	Y	QM	R, PJ, O	LD, MD	TG, PA, MV, BM, DG	MM - CDF, MV	Y	Y	Y	UD	LR, ENC
Pennsylvania	83,000	–	45,000	36,900	8,100	8,100	Y	Y	N	Y	VB	PW, R	MD	TG, PA, MV, BM, DG	MM - UD	Y	Y	N	N	LR, LK, ENC, WL
Rhode Island	1,498	979	272.8	188.1	84.7	78.5	Y	N	N	Y	VB	SS, PJ	HC, MD	TG, BM	MM - 75th %tile of ref. pop.	Y	Y	Y	N	–
South Carolina	35,461	25,729	**678.6**	**563.98**	**114.6**	**114.6**	Y	N	N	N	VB	R	LD	TG, BM	MM - CDF	Y	Y	Y	N	LR
South Dakota	9,937	1,932	3.73	n/a	n/a	n/a	Y	N	Y	N	VB, QM, HY	PJ (UD)	LD (UD)	TG, BM	MM - 25th %tile of ref. pop.	Y	N	Y	N	LR, LK, RES

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Tennessee	60,187	–	24,233	16,693	7,540	14,333	Y	N	N	N	VB	R	LD	TG,PA, MV, BM	MM - 25% of 90th %tile of ref. pop.	Y	Y	Y	UD	–
Texas	191,228	40,194	266.9	196.1	70.8	–	Y	Y	N	N	QM	SS, PW, R, PJ	LD	TG, PA, BM	MM - 50th %tile of ref. pop.	Y	Y	Y	N	LR, ENC, WL
Utah	85,916	14,000+	705	75	630	300	Y	N	UD	N	QM, O	n/a	n/a	TG, BM, O	–	Y	N	N	N	LK, RES
Vermont	7,099	7,099	~800	~650	~150	~150	Y	Y	Y	N	VB, HY, O	SS, R, PJ	HC, PJ, MD	TG, PA, MV, BM	MM - CDF	Y	Y	Y	N	–
Virginia	50,329	50,329	15,540.4	13,321.9	2,218.5	2,218.5	Y	N	N	N	VB	SS, PW, PJ	–	TG	–	Y	Y	N	N	LK
Washington	73,886	39,483	3,275	982.5	2,292.5	0	Y	Y	Y	Y	VB, QM, HY	R, PJ	HC, LD, MD	TG, MV, BM	MM - 25th %tile of ref. pop.	Y	Y	UD	N	–
West Virginia	32,278	21,114	5,745	3,706	2,039	1,315	Y	Y	N	N	VB, QM, O	R, PJ	MD	TG, BM	MM - 5th %tile of ref. pop.	Y	Y	N	N	–
Wisconsin	55,000	32,000	24,422	7,989	12,028	–	Y	Y	Y	N	QM	SS, R	LD, PJ, O	TG, PA, MV, BM, DG	MM - 25th %tile of ref. pop.	Y	Y	N	N	LR, LK, RES, WL
Wyoming	113,422	32,520	2,639	2,124	177	177	Y	N	UD	N	VB, QM, HY,	R, PJ	LD, PJ	MV (UD), TG,	MM - 25th %tile	Y	Y	**Y**	UD	LR, LK,

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																		Narrative	Numeric	
TERRITORIES																				
American Samoa	–	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N	N	N	N	–
Commonwealth of Northern Mariana Islands (CNMI)	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N	N	**N**	N	ENC
Puerto Rico	5,394.2	–	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	UD	N	N	N	–
U.S. Virgin Islands	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N	N	N	N	–
TRIBES																				
Confederated Tribes of the Colville Res.	–	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N	N	N	N	–
Nez Perce Tribe	–	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	UD	n/a	n/a	n/a	–
Oneida Nation of Wisconsin	233	–	–	n/a	n/a	n/a	Y	Y	N	N	VB, QM	PJ	LD	TG, PA, BM	MM	Y	n/a	n/a	n/a	LR, LK, WL

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																		Narrative	Numeric	
Passamaquoddy Tribe, Pleasant Point Res.	–	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N	n/a	n/a	n/a	ENC
Pyramid Lake Paiute Tribe	–	–	31+	–	–	–	Y	Y	Y	N	VB, QM	PJ	HC, PJ	UD	UD	Y	n/a	UD	UD	LK
Seminole Tribe of Florida	–	–	–	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N	N	N	N	–
INTERSTATE COMMISSIONS																				
DRBC	200	–	200	n/a	n/a	n/a	Y	Y	N	Y	VB, HY, O	R, O	HC, LD	TG, BM	–	Y	n/a	Y	Y	LR
ICPRB	383	–	n/a	n/a	n/a	n/a	Y	Y	N	Y	VB	R	LD, GR	TG, PA, MV, BM	MM - UD	Y	n/a	n/a	n/a	–
ORSANCO	981	–	981	974	7	55	Y	Y	N	N	O	SS, R, PJ	LD	TG, PA, MV, BM, DG	MM - 25th %tile of ref. pop.	Y	Y	Y	UD	LR
SRBC	31,193	–	3,520	2,525	995	n/a	Y	N	N	N	VB	R, PJ	LD	TG, BM	MM - O	Y	Y	n/a	n/a	LR

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APPENDIX B.

EPA CONTACTS

Appendix B. EPA CONTACTS

Regional Biocriteria Coordinators

REGION 1
(CT, ME, MA, NH, Passamaquoddy Tribe - Pleasant Point Reservation, RI, VT)

Peter Nolan, *Regional Biocriteria Coordinator*
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REGION 2
(DRBC, NJ, NY, Puerto Rico and the US Virgin Islands)

James Kurtenbach, *Regional Biocriteria Coordinator*
USEPA - Region 2
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Edison, NJ 08837-3679
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REGION 3
(DE, DC, ICPRB, MD, PA, SRBC, VA, WV)

Margaret Passmore, *Regional Biocriteria Coordinator*
USEPA - Region 3
Wheeling Operations Office - Mail Code 3ES31
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11th and Chapline Streets
Wheeling, WV 26003
Phone 304/234-0245, Fax 304/234-0259
email: passmore.margaret@epa.gov

REGION 4
(AL, FL, GA, KY, MS, NC, Seminole Tribe, SC, TN)

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USEPA - Region 4
61 Forsyth Street, S.W.
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Phone 404/562-9271
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REGION 5
(IL, IN, MI, MN, OH, ORSANCO, Oneida Nation of Wisconsin, WI)

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REGION 6
(AR, LA, NM, OK, TX)

Philip Crocker, *Regional Biocriteria Coordinator*
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REGION 7
(IA, KS, MO, NE)

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Kansas City, KS 66101
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REGION 8
(CO, MT, ND, SD, UT, WY)

Tina Laidlaw, *Regional Biocriteria Coordinator*
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Jill Minter, *Regional Biocriteria Coordinator*
USEPA - Region 8
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REGION 9
(American Samoa, AZ, CA, CNMI, HI, NV, Pyramid Lake Paiute Tribe)

Gary Wolinsky, *Regional Biocriteria Coordinator*
USEPA - Region 9
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75 Hawthorne Street
San Francisco, CA 94105
Phone 415/972-3498, Fax 415/947-3545
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REGION 10
(AK, Confederated Tribes of the Colville Reservation,
ID, Nez Perce Tribe, OR, WA)

Gretchen Hayslip, *Regional Biocriteria Coordinator*
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EPA Headquarters

Bill Swietlik, *Program Manager*
USEPA Office of Water
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Phone 202/566-1129, Fax 202/566-1140 or 1139
email: swietlik.william@epa.gov

Questions regarding a specific entity's program should be directed to the contact(s) listed at the top of each entity's program summary in Chapter 3. Questions regarding other sections of this document may be directed to any of the following USEPA Headquarters contacts:

Wayne Davis
USEPA Office of Environmental Information
Environmental Science Center
701 Mapes Road
Ft. Meade, Maryland 20755-5350
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APPENDIX C.

ORIGINAL CHECKLIST TEMPLATE

Appendix C. ORIGINAL CHECKLIST TEMPLATE

Form Approved
OMB Control No. 2040-0049
Approval Expiration: 7/31/02

Survey of State/Tribal Water Quality Programs for Protecting Aquatic Life Through the Use of Bioassessments and Biocriteria

Contact Information:

state	
name	
position	
agency/organization	
mailing address	
phone	
fax	
email	
website	

Briefly describe your professional responsibilities as they relate to water quality standards, conducting bioassessments, and establishing biocriteria.

For each waterbody type below with biological programs, please provide a contact (if different than yourself)

	name	**phone**	**email**
non-wadeable rivers			
lakes			
reservoirs			
estuaries/near-coastal marine			
wetlands			

Please attach any ancillary materials that will provide further in insight or background about your program and/or agency. Examples might include an organizational chart, promotional materials, etc. THANK YOU!

State/Tribal WaterQuality Supporting Aquatic Life Use Designations and Biocriteria Development

1 With respect to your program, which waterbody type categories apply ("X"), and which is being described using this checklist ("XX")?

	wadeable streams, creeks, rivers
	non-wadeable rivers
	lakes
	reservoirs
	estuaries and near-coastal marine
	wetlands

2 For lotic systems, how are they defined?

	stream order
	drainage area
	other (please describe)

3 With respect to the resource type for this checklist, what is the percentage of information in your state, tribal land, or basin, coming from the following entities?

	state/tribal water quality agency
	state fish & game agency
	USEPA
	other federal agency
	consultants
	volunteer monitoring programs
	local college or university
	regulated entities
	other (please describe)

4 Do you contract out any or all or your bioassessment work?

	Yes
	No

4a If you answered yes to #4, please specify the percentage contracted out to each type of entity for field and lab work.

field	lab	
		consultants
		other state agency
		volunteer monitoring groups
		federal agency
		college or university
		other (please describe)

5 What is the lead agency USING the bioassessment information?

6 In which ways are bioassessments used within the water quality program in your state, tribe, or basin? Please check Yes (Y), No (N), or Unsure (?) for all that apply.

Y	N	?	
			problem identification (screening)
			nonpoint source assessments
			monitoring the effectiveness of BMPs
			aquatic life use determinations/ambient monitoring
			promulgated into state WQ standards as biocriteria
			support of antidegradation
			evaluation of discharge permit conditions
			TMDL assessment & monitoring
			other (please describe)

7 Which of the following monitoring designs are used (please check all that apply)?

	targeted (i.e., sites selected for a specific purpose)
	fixed station (i.e., WQ monitoring stations)
	probabalistic by stream order/catchment area
	probalistic by ecoregion, or statewide
	rotating basin
	other (please describe)

7a For each monitoring design checked in #7, please indicate how it is implemented (check all that apply for each design).

special projects only	specific river basins or watersheds	comprehensive use throughout jurisdiction

8 Indicate the extent of resources assessed using biology (e.g., miles, acres, etc.)

- [ ] extent of resource assessed for biology (total)
- [ ] extent of resource fully supporting for 305b
- [ ] extent of resource partially supporting/non supporting for 305b
- [ ] extent of resource listed for 303d
- [ ] number of sites sampled
- [ ] extent of resource per site (if predetermined)

8a Please indicate which of the following units of measure you used to answer #8

- [ ] watersheds
- [ ] acreage
- [ ] miles
- [ ] other (please describe)

9 What is the basis for determining the extent of the resource?

- [ ] RF3
- [ ] National Hydrography Database
- [ ] state based
- [ ] other (please describe)

10 Please use this space to add any additional information you'd like about programmatic elements.

11 What are your Aquatic Life Use Support (ALUS) designations based on?

- ☐ Single Aquatic Life Use
- ☐ Class System (A,B,C)
- ☐ Fishery Based Uses
- ☐ Warm Water vs. Cold Water

11a How many different aquatic life use designations are contained in your water quality standards (WQS)? Please describe.

11b Does your state plan to further refine its AL designated uses in the next triennial WQS review?

- ☐ Yes
- ☐ No

12 If you have narrative biocriteria in your WQS. Is the attached description accurate?

- ☐ Yes
- ☐ No

12a If you answered no to #12, please correct below

13 For your narrative biocriteria, do you have formal/informal numeric procedures to support your decisions?

- ☐ Yes
- ☐ No

*If you answered yes to #13, where are these procedures located (e.g., in the WQS)?

13a If you answered no to #13, do you use a qualitative and/or narrative scale of condition?

- ☐ Yes
- ☐ No

*Where are the scale(s) located?

14 Do you have numeric biocriteria?

- ☐ Yes
- ☐ No

*If you answered yes to #14, where are they located?

14a If you have numeric biocriteria, please describe or attach separate description.

15 Are bioassessment data used in an integrated assessment with other environmental data (e.g., toxicity testing and chemical specific criteria)? Please check Yes (Y), No (N), or Unsure (?) for all that apply.

Y	N	?	
☐	☐	☐	for assessment of aquatic resources
☐	☐	☐	for cause and effect determinations
☐	☐	☐	for permitted discharges
☐	☐	☐	for monitoring (e.g., improvements after mitigation)
☐	☐	☐	for watershed based management

15a For each box you answered yes to in #15, do you use

- ☐ independent application (IA)
- ☐ weight-of-evidence
- ☐ combination
- ☐ other (explain)

16 Do you know where bioassessments/biocriteria have been used in making management decisions regarding restoration of the aquatic resources to its designated ALUS?

☐ Yes
☐ No

16a If you answered yes to #16, please elaborate.

17 How many full time employees were devoted to

☐ developing the bioassessment/biocriteria program
☐ maintaining the bioassessment/biocriteria program

18 Please use this space to add any additional information you'd like about your ALUS descision making process

19 How are your reference sites determined?

- ☐ site-specific
- ☐ paired watersheds
- ☐ regional (aggregate of sites)
- ☐ professional judgement
- ☐ other (please describe)

19a How do you define a reference site?

19b Do you have reference site criteria?

- ☐ No
- ☐ Yes (If so, please describe in space below.)

20 If you use regional reference conditions, how do you characterize those sites?

- ☐ historical conditions
- ☐ least-disturbed sites
- ☐ gradient response
- ☐ judgement prescription
- ☐ other (please describe)

21 If you use regional reference sites, how do you characterize (stratify) your streams?

- ☐ ecoregions (or some aggregate)
- ☐ elevation
- ☐ stream type
- ☐ multivariate grouping
- ☐ jurisdictional (i.e., statewide)
- ☐ other (please describe)

22 Please indicate how many reference sites you have

- ☐ by strata
- ☐ total

23 What are your criteria for defining reference sites and, if applicable, disturbed sites (e.g., D.O., sulfates, habitat)?

23a Are your reference sites linked to your aquatic life designated uses?

- ☐ Yes
- ☐ No

23b Are your reference sites/conditions identified or referenced in your WQS?

- ☐ Yes (provide citation_____)
- ☐ No

23c Do any of your reference sites represent acceptable man-induced conditions?

- ☐ Yes
- ☐ No

24 Which of the following assemblages are assessed by your program? Please check Yes (Y), No (N), or Unsure (?) for all that apply.

	Y	N	?
phytoplankton	☐	☐	☐
periphyton	☐	☐	☐
macrophytes	☐	☐	☐
zooplankton	☐	☐	☐
benthos	☐	☐	☐
fish	☐	☐	☐
amphibians/reptiles	☐	☐	☐
waterfowl	☐	☐	☐

24a For each assemblaged assessed in #24, please indicate the range of samples processesed per year

	< 100	100-500	> 500
phytoplankton	☐	☐	☐
periphyton	☐	☐	☐
macrophytes	☐	☐	☐
zooplankton	☐	☐	☐
benthos	☐	☐	☐
fish	☐	☐	☐
amphibians/reptiles	☐	☐	☐
waterfowl	☐	☐	☐

24b For each assemblaged assessed in #24, please indicate the level of rigor by choosing A, B, C, D, or E

- ☐ phytoplankton
- ☐ periphyton
- ☐ macrophytes
- ☐ zooplankton
- ☐ benthos
- ☐ fish
- ☐ amphibians/reptiles
- ☐ waterfowl

A single observation (no discrete season), limited sampling (e.g., 1-2 sites)
B single season, multiple sites (not at watershed level)
C single season, multiple sites (watershed level)
D single season, multiple sites (broad coverage)
E multiple seasons, multiple sites (broad coverage for watershed level)

25 Do you perform habitat assessments at your sites?

- ☐ Yes
- ☐ No

25a If you answered yes to #25, how are they conducted?

- ☐ with bioassessments
- ☐ independent of bioassessments

25b If you answered yes to #25, what type of habitat assessment is used?

- ☐ visual based (e.g., QHEI, RBP, etc.)
- ☐ quantitative measurements (e.g., EMAP)
- ☐ hydrogeomorphology (e.g., Rosgen)
- ☐ other quantitative parameters (e.g., pebble counts, sediment index, etc.) (please describe)

25c Are these habitat reference conditions cited or mentioned in your WQS?

- ☐ Yes (provide citation_____)
- ☐ No

26 Do you use biological information to facilitate public participation in setting WQS?

- ☐ Yes (please describe in space below)
- ☐ No

27 Which of the following are part of your quality assurance (QA) program? Please check Yes (Y), No (N), or Unsure (?) for all that apply.

Y	N	?	
			standard operating procedures (SOPs)
			quality assurance plan (QAP)
			periodic meetings, training for biologists
			sorting proficiency checks
			taxonomic proficiency checks
			specimen archival
			other (please describe)

28 Do you have a certification program for bioassessment?

- ☐ Yes
- ☐ No

If yes, briefly describe:

Questions 29 -33 deal with field issues specific to BENTHOS. Please describe your program by checking all that apply. If your program does not assess this assemblage, please skip these questions.

29 Sampling gear-- please check all that apply to your program

- ☐ Surber
- ☐ Hess
- ☐ Slack (0.5 m)
- ☐ D-frame
- ☐ dipnet
- ☐ kick net (1 m)
- ☐ multiplate
- ☐ rock baskets
- ☐ collect by hand
- ☐ other (please describe)

29a Indicate the mesh size used by your program (in microns)

- ☐ 200 - 400
- ☐ 500 - 600
- ☐ > 800
- ☐ other (please describe)

29b Indicate the area sampled

- ☐ < 1 m^2
- ☐ 1 - 3 m2
- ☐ 3 - 6 m
- ☐ other (please describe)

30 Reach length

- ☐ selected habitat
- ☐ habitat sequences or cycles
- ☐ fixed distance
- ☐ stream width formula
- ☐ time
- ☐ other (please describe)

31 Habitat selection

- ☐ richest habitat
- ☐ riffle/run (cobble)
- ☐ multihabitat
- ☐ artificial substrate
- ☐ woody debris
- ☐ other (please describe)

32 Where are samples processed?

- ☐ field
- ☐ lab

32a What is the target subsample size?

- ☐ 100 count
- ☐ 200 count
- ☐ 300 count
- ☐ 500 count
- ☐ proportional/volume
- ☐ entire sample
- ☐ other (please describe)

33 What level of taxonomy do you use?

- ☐ order
- ☐ family
- ☐ genus
- ☐ species
- ☐ combination
- ☐ other (please describe)

Questions 34 - 38 deal with field issues specific to FISH/AMPHIBIANS. Please describe your program by checking all that apply. If your program does not assess these assemblages, please skip these questions.

34 Sampling gear-- please check all that apply to your program

- [ ] seine
- [ ] backpack electrofisher
- [ ] boat electrofisher
- [ ] pram unit (tote barge)
- [ ] other (please describe)

34a Seine and/or dipnet mesh size (in inches)

- [ ] 1/8"
- [ ] 3/16"
- [ ] 1/4"
- [ ] 3/8"
- [ ] 1/2"

35 Reach length

- [ ] selected habitat
- [ ] habitat sequences or cycles
- [ ] fixed distance
- [ ] stream width formula
- [ ] time
- [ ] other (please describe)

36 Habitat selection

- [ ] pool/glide
- [ ] riffle/run (cobble)
- [ ] multihabitat
- [ ] other (please describe)

37 Where are the samples processed?

- [ ] field
- [ ] lab

37a How are the samples processed?

- [ ] length measurement
- [ ] biomass--individual
- [ ] biomass--batch
- [ ] anomalies

37b How are samples subsampled?

- [ ] selected species
- [ ] batch
- [ ] selected size
- [ ] none
- [ ] other (please describe)

38 What level of taxonomy do you use

- [ ] species
- [ ] subspecies
- [ ] life stage
- [ ] other (please describe)

Questions 39 -43 deal with field issues specific to PERIPHYTON. Please describe your program by checking all that apply. If your program does not assess this assemblage, please skip these questions.

39 Sampling gear-- natural substrate

- [ ] suction device
- [ ] bar clamp sample
- [ ] brushing/scraping device (razor, toothbrush, etc.)
- [ ] collect by hand
- [ ] other (please describe)

39a Sampling gear-- artificial substrate

- [ ] periphytometer
- [ ] microslides or other suitable substratum
- [ ] collect by hand
- [ ] other (please describe)

40 Reach length

- [ ] selected habitat
- [ ] habitat sequences or cycles
- [ ] fixed distance
- [ ] stream width formula
- [ ] time
- [ ] other (please describe)

41 Habitat selection

- [ ] richest habitat
- [ ] riffle/run (cobble)
- [ ] multihabitat
- [ ] artificial substrate
- [ ] other (please describe)

42 How are samples processed?

- [ ] chlorophyll *a*/ phaeophytin
- [ ] biomass
- [ ] taxonomic identification
- [ ] other (please describe)

43 What level of taxonomy do you use?

- [ ] diatoms only
- [ ] all algae
- [ ] division level
- [ ] genus level
- [ ] species level
- [ ] other (please describe)

44 Please use this space to add any additional information you'd like about your field and lab methods.

Data Analysis and Interpretation for Determining Biological Condition of Aquatic Life Uses and Deriving Biocriteria

45 Which data analysis tools and methods do you use (check all that apply)?

- ☐ summary tables, illustrative graphs
- ☐ parametric ANOVAs
- ☐ multivariate analysis
- ☐ biological metrics
- ☐ disturbance gradients
- ☐ other (please describe)

46 If you use biological gradients, how are the metrics selected and tested?

- ☐ selected by consensus
- ☐ tested for sensitivity, ecological value
- ☐ calibrated for natural gradients (and covariates)

46a Please describe your response to #46

47 If you use biological metrics, how is the threshold determined for transforming metrics into unitless scores?

- ☐ 25th %tile of reference population
- ☐ 50th %tile of reference population
- ☐ 75th %tile of reference population
- ☐ 95th %tile of reference population
- ☐ 95th %tile of all sites
- ☐ cumulative distribution function
- ☐ other (please describe)

48 If you use biological metrics do you

- ☐ aggregate metrics into an index
- ☐ return single metrics (use endpoint for each single metric)

49 If you use a multimetric index, how do you define the impairment threshold?

- ☐ 25th %tile of reference population
- ☐ 50th %tile of reference population
- ☐ 75th %tile of reference population
- ☐ 95th %tile of reference population
- ☐ 95th %tile of all sites
- ☐ cumulative distribution function
- ☐ other (please describe)

50 If you use a multivariate technique, how do you define the impairment threshold?

- ☐ 5th %tile of reference population
- ☐ 10th %tile of reference population
- ☐ Significant departure from mean of reference population
- ☐ other (please describe)

51 Have you evaluated the performance characteristics of your bioassessment results?

- ☐ Yes
- ☐ No

51a If you answered yes to #51, please describe. Please check Yes (Y), No (N), or Unsure (?) for all that apply.

Y	N	?		
☐	☐	☐	repeat sampling (please describe)	
☐	☐	☐	precision (please describe)	
☐	☐	☐	sensitivity (please describe)	
☐	☐	☐	bias (please describe)	
☐	☐	☐	accuracy (please describe)	

52 Please use this space to add any additional information you'd like about your data analysis and interpretation methods.

53 Identify where your biological data are stored. Please check Yes (Y), No (N), or Unsure (?) for all that apply.

Y	N	?	
			STORET
			other database (what program/application)
			spreadsheets (what program/application)
			paper files only
			other (please describe)

54 Please describe how data are retrieved and analyzed. Please check Yes (Y), No (N), or Unsure (?) for all that apply.

Y	N	?	
			SAS
			Systat
			Statistica
			EDAS
			other (please describe)

55 Please list any website URLs for all relevant data.

56 Please list all documents and references used to provide this information (e.g., SOPs, 305(b) reports, etc.)any website URLs for all relevant data.

57 Please use this space to add any additional information you'd like about your information management.

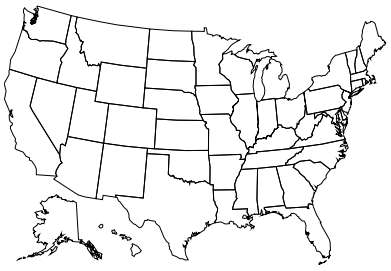
APPENDIX D.

PROGRAM SUMMARY TEMPLATE

Appendix D. PROGRAM SUMMARY TEMPLATE

The numbers of relevant checklist questions (see Appendix C) are colored black and found within each corresponding program summary section.

ENTITY NAME



Contact Information

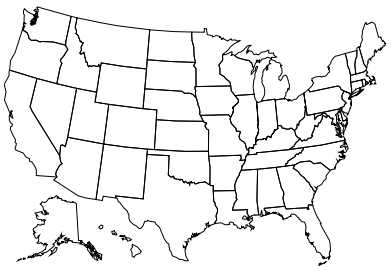
Contact name, title
Agency
Street ■ city/state/zip
Phone ■ Fax
email:

Program Description

Documentation and Further Information

#55, 56

ENTITY NAME



Contact Information

Contact name, title
Agency
Street ■ city/state/zip
Phone ■ Fax
email:

Programmatic Elements

Uses of bioassessment within overall water quality program ***#6***	☐	problem identification (screening)
	☐	nonpoint source assessments
	☐	monitoring the effectiveness of BMPs
	☐	ALU determinations/ambient monitoring
	☐	promulgated into state water quality standards as biocriteria
	☐	support of antidegradation
	☐	evaluation of discharge permit conditions
	☐	TMDL assessment and monitoring
	☐	other:
Applicable monitoring designs ***#7, (7a)***	☐	targeted (i.e., sites selected for specific purpose)
	☐	fixed station (i.e., water quality monitoring stations)
	☐	probabilistic by stream order/catchment area
	☐	probabilistic by ecoregion, or statewide
	☐	rotating basin
	☐	other:

Stream Miles

Total miles

(determined using... ***#8b***)

Total perennial miles

Total miles assessed for biology ***#8***

fully supporting for 305(b)

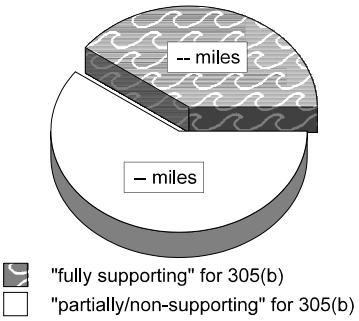
partially/non-supporting for 305(b)

listed for 303(d)

number of sites sampled

number of miles assessed per site

Miles Assessed for Biology



Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis		*#11*
ALU designations in state water quality standards		*#11a*
Narrative Biocriteria in WQS		*#12 to 13a*
Numeric Biocriteria in WQS		*#14, 14a*
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria) *#15*	☐	assessment of aquatic resources
	☐	cause and effect determinations
	☐	permitted discharges
	☐	monitoring (e.g., improvements after mitigation)
	☐	watershed based management
Uses of bioassessment/ biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU		*#16, 16a*

Reference Site/Condition Development

Number of reference sites		*#22*
Reference site determinations *#19*	☐	site-specific
	☐	paired watershed
	☐	regional (aggregate of sites)
	☐	professional judgment
	☐	other:
Reference site criteria		*#19b, 23*
Characterization of reference sites within a regional context *#20*	☐	historical conditions
	☐	least disturbed sites
	☐	gradient response
	☐	professional judgment
	☐	other:
Stream stratification within regional reference conditions *#21*	☐	ecoregions (or some aggregate)
	☐	elevation
	☐	stream type
	☐	multivariate grouping
	☐	jurisdictional (i.e., statewide)
	☐	other:
Additional information	☐	reference sites linked to ALU *#23a*
	☐	reference sites/condition referenced in water quality standards *#23b*
	☐	some reference sites represent acceptable human-induced conditions *#23c*

Field and Lab Methods

Assemblages assessed *#24, (24a, 24b)*	☐	benthos *(# samples/year; level of rigor)*
	☐	fish
	☐	periphyton
	☐	other:
Benthos		
sampling gear	*#29, 29a*	
habitat selection	*#31*	
subsample size	*#32a*	
taxonomy	*#33*	
Fish		
sampling gear	*#34, 34a*	
habitat selection	*#36*	
sample processing	*#37a*	
subsample	*#37b*	
taxonomy	*#38*	
Periphyton		
sampling gear	natural substrate *#39*; artificial substrate *#39a*	
habitat selection	*#41*	
sample processing	*#42*	
taxonomy	*#43*	
Habitat assessments	*#25 to 25c*	
Quality assurance program elements	*#27, 28*	

Data Analysis and Interpretation

Data analysis tools and methods *#45*	☐	summary tables, illustrative graphs
	☐	parametric ANOVAs
	☐	multivariate analysis
	☐	biological metrics *(#48)*
	☐	disturbance gradients
	☐	other:
Multimetric thresholds		
transforming metrics into unitless scores	*#47*	
defining impairment in a multimetric index	*#49*	
Multivariate thresholds		
defining impairment in a multivariate index	*#50*	
Evaluation of performance characteristics *#51, 51a*	☐	repeat sampling
	☐	precision
	☐	sensitivity
	☐	bias
	☐	accuracy
Biological data		
Storage	*#53*	
Retrieval and analysis	*#54*	